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ABSTRACT

The effects of two social contexts on the risk -taking behavior of elementary boys on a shuffleboard task were investigated. It was predicted that Atkinson's motive-probability-incentive (M-P-I) model would be supported in the peer-competitive context, in that the success-oriented subjects would choose more goals with median Ps values than the failure-avoidant subjects, but that these two groups would not differ in this regard in the adult-evaluative context. These hypotheses were supported. A test was also made of Atkinson's recent prediction that performance will relate positively to summated motivation in the peer-competitive context but negatively to this variable in the adult-evaluative context. These predictions were partly supported, and the data were interpreted in terms of the inverted U curve postulated to hold between discriminative behavior and total arousal. The summated motivation measure is a combination of need for achievement, defensiveness and test anxiety. (Author/DB)

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Abstract

This study investigates the effects of two social contexts on the risk-taking behaviour of elementary school boys on a shuffleboard task. It is predicted that Atkinson's motive-probability-incentive (M-P-I) model will be supported in the peer-competitive context, in that the success-oriented subjects will choose more goals with median Ps values than the failure-avoidant subjects, but that these two groups will not differ in this regard in the adult-evaluative context. These hypotheses are supported. A test is also made of Atkinson's recent prediction that performance will relate positively to summated motivation in the peer-competitive context but negatively to this variable in the adult-evaluative context. These predictions are partly supported, and the data are interpreted in terms of the inverted U curve postulated to hold between discriminative behaviour and total arousal. The summated motivation measure is a combination of need for achievement, defensiveness and test anxiety.

RISK TAKING AND PERFORMANCE IN RELATION TO ACHIEVEMENT-RELATED MOTIVES, DEFENSIVENESS AND SOCIAL CONTEXT[1]

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Recent publications have suggested that risk taking is a function not only of the chronic motivational dispositions (see Atkinson, 1957) that a subject brings to a task but also the social context in which the task is presented (Atkinson & O'Connor, 1966; Damm, 1968). In view of the number of studies that have established the validity of Atkinson's motive-probability-incentive (M-P-I) model of risk taking when tasks are presented in peer-competitive contexts (e.g., Atkinson, Bastian, Earl & Litwin, 1960; Atkinson & Litwin, 1960; Brody, 1963), it seems important to us that the model should be examined in relation to goal-setting in other social contexts.

The Atkinson (1957) model takes account of three variables: certain 'relatively permanent and stable dispositions' elicited in any achievement situation, a subject's perceived probabilities of success and failure and the incentive value of success and failure associated with these probabilities. The motivational dispositions basic to the model are need for achievement (n Achievement) and test anxiety, conceptualised, respectively, as motive to approach success (Ms) and motive to avoid failure (Maf).

Incentive values of success (Is) and failure (If) are assumed to be related, respectively, in an inverse and in a direct fashion to probabilities of success (Ps), i.e., Is = I - Ps and If = -Ps. From the model it follows

that subjects with Ms > Maf (hereafter referred to as the Ms) will take median risks, i.e., choose goals with a Ps of about .5, whereas their opposites the Maf > Ms (or, more simply, the Maf) will choose goals with more extreme Ps values.

In the situation where incentive points of, say, nine to one are offered for successful achievement of goals ranging in Ps from .1 to .9, an individual maximises his performance score potential when he chooses a goal with Ps = .5. A subject choosing a Ps of .5 on each of 10 trials should get 25 points in all, whereas a subject choosing a Ps of, say, .8 for all trials should get only 16 points and would, in fact, get only 20 points if he were successful on every trial. However, it is not assumed that, with the introduction of incentive points by the experimenter, the subjects are aware that the choice of median Ps goals maximises scoring potential.

Predictions concerning the Ps choices of the Ms and the Maf have been validated in the previously cited studies by Atkinson and his associates in which incentive points were not offered by the experimenter. In these studies, college males were presented with tasks, e.g., shuffleboard or ring toss, in peer-competitive (PC) contexts in which the experimenters remained as unobtrusive as possible. Other studies, employing implicitly adult-evaluative (AE) contexts, have failed to support the model. In two such studies (Damm & Cleary, unpublished, 1966; de Charms & Dave, 1965), preadolescent males interacted individually with the experimenter in the goal-setting task. Each of these adult-evaluative (AE) studies also differed from the Atkinson studies, in that they provided subjects with objective probabilities established in pre-experimental sessions and offered subjects incentive points for successful shots. de Charms and Dave (1965) found no reliable difference between the Ps

choices of the Ms and the Maf. Damm and Cleary (1966) found that the Ps values chosen by the Maf approximated .5 more closely than those chosen by the Ms ($p < .10$). While objective instead of subjective probabilities may have affected the Ps choices in these studies, it seems more likely that the different social contexts employed were responsible for these nonconfirmatory and reversed findings.

Studies relating n Achievement to performance have found that sources of motivation extrinsic to the task itself have affected predicted relationships. Atkinson and Raphelson (1956) found no correlation between performance in arithmetic and achievement motivation under a 'multi-incentive' condition (in which n Affiliation was probably elicited as well as n Achievement), whereas there was a positive relationship under a condition of 'achievement-orientation.' Need for affiliation would seem likely to be more strongly elicited in an adult-evaluative (AE) than in a peer-competitive (PC) context.

Atkinson and O'Connor (1966) found that n Affiliation related positively to performance on tasks requiring interaction of the subject with the experimenter, but that it was not related to scores on a task which the subject took privately. These authors suggest that just as the intrinsic incentive value of successful achievement is given by $Is = 1 - Ps$, so is the incentive value of successful affiliation.

Two possible effects of social contexts eliciting n Affiliation are considered by Atkinson and O'Connor (1966): when affiliative tendencies are strongly elicited, all subjects may perform better or those who are high in n Achievement may be more than optimally aroused and thus not perform as well as they do in PC contexts--an effect not unlike that attributed by Yerkes and Dodson (1908) to greater than optimal arousal on discriminative behaviour.

Atkinson and O'Connor interpret results from their own and earlier studies (e.g., Smith, 1966) in the latter way because n Affiliation alone led to successful performance, whereas high n Affiliation combined with moderate to high n Achievement produced a performance decrement.

The second factor intrinsically related to achievement is test anxiety. Conceptualising test anxiety as the motive to avoid failure, Atkinson (1964) argues that it inhibits all behaviour, including task-oriented 'approach' behaviour, which might lead to failure. Consequently, when the arousal of approach motivation is greater than optimal (e.g., when high n Affiliation as well as high n Achievement are elicited by an evaluative experimenter and by a challenging task respectively), a strong tendency to avoid failure should, paradoxically, enhance performance by reducing approach drive to a level closer to the optimal.

Imagine two subjects--one with high n Achievement and low test anxiety (Ms) and the other the opposite of this (Maf)--each with a high chronic level of n Affiliation. If a PC context fails to elicit affiliative tendencies, the first individual should be close to optimally aroused and should be successful in such a context, whereas the Maf should be less than optimally aroused. In an AE context the Ms individual may be more than optimally aroused, and, while this might be expected to affect his performance, it does not follow that his goal-setting will be affected. The Maf individual in an AE context, in which the debilitating effect of his test anxiety is offset by the elicitation of his n Affiliation, should be closer to optimally aroused than he would be in a PC context. For those Ms and Maf individuals with low to moderate chronic n Affiliation the differential effects of the two contexts might be expected to be slight.

If n Affiliation is a significant source of motivation in certain contexts in which goal-setting tasks are presented, defensiveness may be another such source. The Defensiveness Scale for Children (DSC) of Sarason, Hill and Zimbardo (1964) is used in the present study. The authors of the scale define defensiveness as an unconscious censoring of negative feelings. Marlowe and Crowne (1961) have developed a Social Desirability Scale, the content of which bears some similarity to that of the DSC. They say,

"Social desirability . . . refers to a need for social approval and acceptance and the belief that this can be attained by means of culturally accepted and appropriate behaviours. In a psychometric situation, a high need for social approval would be inferred from a person's attribution of culturally approved statements to himself and the denial of culturally unacceptable traits [pp. 109-110]."

It seems to us that the negative feelings censored by defensive subjects on the DSC relate to culturally unacceptable traits. If so, a defensive individual should show a greater sensitivity to certain social contexts than a less defensive person, and defensiveness should combine with n Achievement and test anxiety in such a way that the summated arousal will have similar effects to that when n Affiliation is combined with these measures of achievement motives.

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There are two ways in which the summated effects of n Achievement, n Affiliation (or defensiveness) and test anxiety may be studied: firstly, in a factorial three-way design involving the eight combinations of dichotomized scores on each; secondly, by converting each subject's scores on the three measures, combining them (n Achievement + n Affiliation - Test Anxiety) and then correlating the composite measure with goal-setting and with performance

scores. The latter method has had to be used in the present study because it has not been possible to locate sufficient cases with distinctively high n Affiliation scores for a factorial design.

Let us assume that a PC context elicits only n Achievement and test anxiety, whereas an AE context elicits n Affiliation (and possibly defensiveness) as well as the two achievement-related motives. Let the typical Ms individual's levels of n Achievement and test anxiety be expressed as z scores of 1.00 and -1.00, respectively, and let the typical Maf individual have the same z scores with the signs reversed for these motive measures. In order to demonstrate the effects of n Affiliation and of defensiveness, let the z scores for 'high' and 'low' scorers on each of these measures be 1.00 and -1.00 respectively. Then in the AE and in the PC contexts, four cases relevant to the present argument would have summated arousal levels as follows:

	AE Context				PC Context		
	n Ach +	(n Aff + Def)	- Test Anx	Σ	n Ach -	Test Anx	Σ
S_1 (Ms)	1.00 +	2.00	- (-1.00)	4.00	1.00 -	(-1.00)	2.00
S_2 (Ms)	1.00 +	(-2.00)	- (-1.00)	0.00	1.00 -	(-1.00)	2.00
S_3 (Maf)	-1.00 +	2.00	- 1.00	0.00	-1.00 -	1.00	-2.00
S_4 (Maf)	-1.00 +	(-2.00)	- 1.00	-4.00	-1.00 -	1.00	-2.00

The significance of a given summated value may lie not in its absolute sum but in its sum relative to others in the same social context. As n Achievement has been shown to relate more closely to performance in situations in which it is presumably the only approach motive elicited than in multi-incentive conditions (Atkinson & O'Connor, 1966), the summated arousal of the

Ms in the PC context (2.00) may be close to optimal. In the AE context the elicitation of approach motives in addition to n Achievement may lead to supra-optimal arousal (4.00 compared with the presumably closer-to-optimal median value of .00 in AE). It is more parsimonious to assume the same optimal value, say 1.00, for both contexts.

The hypotheses to be tested in relation to subjects given 10 trials in a shuffleboard task presented in either a PC or an AE context are set out below. The Ms and Maf subjects have been selected so that as groups they do not differ reliably in either n Affiliation or defensiveness scores.

(1) In PC, the Ms will choose more goals with median Ps values than will the Maf.

(2) In AE, these two groups will not differ in the degree to which their Ps choices deviate from the median value.

(3) In PC, the Ms operating at a close to optimal level of arousal will show greater consistency in their goal-setting behaviour from trial to trial than the Ms will in AE.

(4) In PC, the performance scores of the Ms will be higher than those of the Maf.

(5) In AE, the two groups will not differ in their performance scores.

(6) Highly defensive compared with less defensive subjects will show greater differences in the goal-setting strategies they adopt in the PC and in the AE contexts.

(7) The summated arousal measure (n Achievement + n Affiliation + Defensiveness - Test Anxiety) will correlate negatively with deviations of Ps choices from the median and positively with performance scores in PC, whereas the reverse will hold in AE.

Method

Subjects

All boys in the fifth and sixth grades in the Princeton Regional School System were given measures of n Achievement, n Affiliation, test anxiety and defensiveness. Of the 351 boys tested, 168 were chosen to provide 36 cases with distinctive Ms > Maf scores (high n Achievement, low test anxiety), 36 with distinctive Maf > Ms scores (low n Achievement, high test anxiety), while the rest comprised 48 with 'high' scores and 48 with 'low' scores on each of the selection variables. Approximately equal proportions were chosen from the two grade levels. The mean age of the experimental sample is 131.5 months (SD = 8.4). Approximately 8 per cent of the children in the school system were Black--a proportion represented among subjects selected for the study.

Selection Variables

n Achievement. This was scored from protocols written in response to the following verbal stem stimuli selected from those used either by Winterbottom (1958) or by Lowell in McClelland, Atkinson, Clark and Lowell (1953).

1. Two men standing by a machine. One is older.
2. A young man alone at night.
3. A father and son talking about something important.
4. A young man sitting at his desk.
5. A boy working on something in his room. A friend is watching.

While each of the five stimuli was expected to produce achievement imagery, stimuli 2 and 5 were included primarily to elicit n Affiliation. The test was entitled 'Making Up Stories' and was presented by one of the authors (J.T.D.) to groups comprised of boys from three to five classes.

Six minutes were allowed for each story. Subjects were encouraged to write their stories under four headings recommended by McClelland et al. (1953). After 90 seconds on each section, subjects were asked to move to the following section. A break of 3 minutes was taken between the third and fourth stimuli.

The protocols were scored by one of the authors (J.T.D.) for n Achievement and n Affiliation according to the criteria recommended in Atkinson (1958). This author had previously scored protocols of Australian boys of the same age. He trained the other author (A.B.) in scoring procedures. The percentage agreement of the two sets of scores of 50 randomly selected sets of protocols was .86. The principal scorer rescored 40 randomly selected sets of protocols six weeks after he first scored them and obtained 89 per cent agreement over the two occasions.

Test anxiety. This variable was measured by 19 of the 30 items of the Test Anxiety Scale for Children (TASC) of Sarason, Davidson, Lighthall, Waite and Ruebush (1960). The 19 items were randomly mixed with 45 other items in a schedule entitled 'What I Am Like.' The additional items comprised the 27-item Defensiveness Scale for Children (Sarason, Hill & Zimbardo, 1964), 6 Test Defensiveness items, 10 Social Extraversion and 2 filler items. This schedule has been used by Wallach and Kogan (1965, pp. 209-211).

Test anxiety and defensiveness scores are simply the number of items checked on each scale. Scores on the other scales within the schedule have not been used in the present study.

It was possible to select distinctive cases to classify as Ms (Ms > Maf), Maf (Maf > Ms) and Low:low on the two achievement-related motive measures. Subjects classified as High:high were mostly only a little above average in n Achievement because of the skewed distribution of these scores in the

entire sample. Most boys with high n Achievement had low test anxiety scores and were thus classified as Ms. Defensiveness scores were also positively skewed.

Although two of the five verbal-stem stimuli were included in the expectation that they would elicit a satisfactory distribution of n Affiliation scores, the distributions obtained from these and from all five stimuli were excessively skewed. More than half of the subjects selected had total n Affiliation scores of -5 or -4 (the highest negative scores possible) and less than one-quarter had positive scores. Consequently, there is likely to be little statistical or theoretical significance in results obtained with this measure.

Pre-experimental Testing to Establish Objective Ps Values

In order to establish for each subject his level of skill at the Shuffleboard task and the nine goal widths which for him have Ps values ranging from .9 to .1, each boy was taken individually to an unused classroom by the young female experimenter (A.B.) and given the following instructions:

"I am interested in finding out how well boys of your age can do on this game. It is called 'Shuffleboard.' The idea is to use this piece of wood to push a coin as straight as you can down the middle of the board so that it goes into this space without touching either of the side wings. It is not always easy to do this as sometimes you may make the coin run off to one side and hit one of the wings. I would like you to make ten shots for each of a number of different goals. Sometimes I will make the goal quite wide like this [5"] when it should be fairly easy to get the coin into the goal without hitting the side wings. At other times I will push the wings in close together so that the goal is smaller, making it harder to score. Let's begin with this goal--it's

about 4 inches wide. You may have ten turns. Try to get it into the goal without touching the wings. Off you go ... [After his ten shots] you scored ___ times when the goal was 4 inches wide. Now let's make the goal smaller [or 'larger' depending on S's actual performance]."

When the subject performed at sufficient goal widths for the calculation of objective probabilities of .1 through .9, the experimenter finished the session by presenting the subject with a goal width likely to result in a high degree of success and said:

"Fine. That's all we're going to do today. You'll get a chance to come back before long and really play a game. Now, of course, when you come back next time you won't get exactly the same score for each goal as you did today. So, before you come back, I'll figure out for you just how many times out of ten you'll be most likely to score when you play the next time. It will help to know this when you play the game. I hope you had fun today. I'll look forward to seeing you next time."

Selection of Subjects for the Social-Context Conditions

The two contexts under investigation are adult-evaluative (AE), in which the subject operates individually with the experimenter and peer-competitive (PC), in which the subject operates in a triad with two of his peers and with the experimenter keeping well in the background. As the subject has only his own pre-experimental and experimental performance as a guide in the AE condition, it seemed desirable to distinguish between subjects taking the first position in a PC triad (PC_1) and those taking either the second or third position ($PC_{2,3}$)[2] because the latter would have additional 'normative' information available to them. In order to obtain AE data comparable with $PC_{2,3}$ data,

each AE subject was given a second set of trials (AE_2) on the grounds that the information gained from his first set of trials (AE_1) in the experimental situation would have some similarity in information value to that gained by $PC_{2,3}$ subjects who had observed a PC_1 member of a triad.

Only Ms and Maf subjects were used in the AE condition. From the pre-experimental data three subgroups each of 12 from the 36 Ms and 36 Maf subjects were matched on skill for the AE, PC_1 and $PC_{2,3}$ conditions. Each PC triad was comprised of one Ms or one Maf subject, one High:high and one Low:low subject. The three members for a given triad were chosen so as to be homogeneous in skill and so that the one set of objective probabilities would serve for all three. Consequently, the 168 subjects in the study comprise 12 Ms and 12 Maf in the AE_1 condition, the same subjects in the AE_2 condition, 12 Ms and 12 Maf in the PC_1 condition in 24 triads in each of which one High:high and one Low:low operate in either the PC_2 or PC_3 position, six Ms and six Maf in each of the PC_2 and PC_3 positions in 24 triads in each of which one High:high and one Low:low operate either in the PC_1 position or the PC_2 or PC_3 position, whichever is not occupied by the key subject (i.e., an Ms or Maf individual) in that triad. The allocation of subjects to experimental conditions is shown in Table 1.

Insert Table 1 about here

Experimental Instructions--Adult-Evaluative Condition

For the AE condition the experimenter (A.B.) took each subject individually and used the following instructions:

"When you were in the other day you made ten shots at each of a number of goals. You will recall that I said I'd work out for you how many times out of ten you would be most likely to score at each of the different goal sizes. I have averaged all of your scores together and have them written on the board. The numbers on the top line tell you how many inches wide the goal is. Underneath that, it tells how many times out of ten you would be likely to score if the goal was that wide.

In other words, if the goal was ___ inches wide you would expect, on the average, to get the coin through seven out of ten times. [E asks S to explain what the '2' under the ___ (") means. If a further example is needed E uses Ps of 0.4.]

Today you get to play a real game and win points when you score a goal. Now some goals, when the opening is very wide, are fairly easy to score. But some, when the opening is very small, are hard to score. So, you wouldn't get the same number of points for every goal. The points you can win are written in the last row on the board.

When the opening is ___ inches wide you would get three points if you scored and you can remember from before that you're likely to score about seven out of ten times when the opening is that wide.

How many points would you get if the opening was ___ inches wide? [Ps = 0.2; Is = 8] Would you be likely to score very often if the opening was that wide? About how often? [two out of ten] That's right. I think you understand."

The subject was then told that he would be given 10 shots and that he could choose any of the nine goal-widths for any shot. The inverse relationship between the Ps and Is values was again explained, and the subject was told to instruct the experimenter as to how wide to make the goal mouth for a

given shot and that the experimenter would record on the board the points won for each successful shot.

Before the first shot E said, "What goal and what number of points do you want to try for first?" After each attempt E said, "You got ___ points for that shot. What goal and how many points do you want to try for the next shot?" After the tenth trial E said, "Let's both add your points and see what your total score is" ...then, "I'll give you ten more shots. Let's see if you can get even more points this next time. Try to get as many points as you can, but at least try to beat your first score. We'll do it exactly the same way."

Experimental Instructions--Peer-Competitive Condition

When the three subjects in a triad were brought to the experimental room, the experimenter reminded them of the previous occasion and said:

"After looking at the scores, you three boys were chosen to play against each other because your scores were all very similar. That will make it a good close contest because you can all play this game about equally well. I've averaged all of your scores together and have them written on the board."

The instructions were then identical with those used with AE subjects. Then E said:

"Now, (1) [addressed by name], you can have your ten shots first, then (2), and then (3).

While (1) is making his shots, I want you, (2), to move this wing for him and you, (3), to move this wing to the right distance for the number of points (1) asks you for. I also want you, (2), to be the scorer for (1). You will all have a chance to be the scorer, so listen carefully. The scorer writes in this column under the player's name the number of points he is trying for on each shot.

In the next column I want the scorer to write down the number of points the player actually wins on each shot. When he misses, write '0' for that shot. . . . When (1) has had his ten shots I want all three of you to add the number of points he scored. Then the scorer will write the total score at the bottom here. Then (2) will have his ten shots and (3) will score for him. Then (3) will have his ten shots and (1) will score for him. I'll sit over here and do some other work. If you are not sure please ask me . . . O.K. off you go to see who can score the highest number of points with his ten shots."

Results

In Atkinson's model the theoretical median Ps is .5. However, in a number of studies (e.g., Atkinson & Litwin, 1960; Damm & Cleary, unpublished, 1966) the empirical median values chosen by all subjects on all trials is nearer to .4. Rotter (1954) describes the 'culturally normal' level of aspiration set by United States subjects as a little above the individual's present level of performance. As a goal level with a subjective Ps of .5 is the one that the individual most expects to achieve, the choice of a Ps of .4 may be close to the culturally normal level of goal-setting in experimental tasks. In the present analyses the empirical .4 (0.396) is used. In no instance do analyses of deviations from .5 produce statistical significance.

The more distinctive cases among the High:highs and among the Low:lows were chosen for PC_1 and less distinctive cases for the second and third positions in the PC condition. In this way the triads in which the critical subjects (the Ms and the Maf) did not operate first were made comparable in

terms of the motivational dispositions of the subjects operating first. This was done in case the goal-setting behaviour (or performance) of the first subject should influence that of the subjects taking second and third positions.

A considerable number of the 48 High:highs and some of the 48 Low:lows operating in either PC_2 or PC_3 have neither distinctively high nor distinctively low scores on one or both of the defining motive measures. For instance, a few High:highs have n Achievement scores not much higher than those of some Maf individuals. In order to have distinctive motivational subgroups for data analyses, only the 12 most distinctive High:highs and the 12 most distinctive Low:lows in the $PC_{2,3}$ condition have been included. Consequently, the total number of subjects for whom data are analysed is 120.

Had it been predicted that there would be a crossover interactive effect on goal-setting and on performance by motive groups (Ms and Maf) and contexts (PC and AE), a two-way analysis of variance would be the relevant test of Hypotheses 1 and 2. However, while H_1 predicts for the PC context results in line with Atkinson's model and his findings, H_2, relating to the AE context, predicts no difference in the deviations of Ps choices of the two motive groups from the median Ps. It thus seemed possible that a two-way analysis of variance might not produce a significant interaction even if H_1 and H_2, tested independently, were supported. Consequently, each hypothesis is tested by means of t tests as shown in Table 2.

Insert Table 2 about here

Results in the upper section of Table 2 support H_1 and, thus, the predictions of the model and the earlier findings when goal-setting tasks have been

presented in PC contexts. The mean Ps choices shown in parentheses do not differ reliably for any pair of subgroups; the largest difference--that between Maf subgroups in PC_1 and in $PC_{2,3}$--produces a $\underline{t}$ value of only 1.27.

Analyses relevant to H_2 are shown in the lower section of Table 2. In both the AE_1 and AE_2 conditions, the differences between the two motive subgroups in the deviations of their Ps choices from .4 are clearly nonsignificant. Because the same subjects are involved in AE_1 and AE_2, their results are not combined. The null prediction in H_2 is supported. The two pairs of means of Ps choices do not differ reliably, the $\underline{t}$ values for AE_1 and AE_2 being 1.34 and .87 respectively.

In H_3 it is predicted that the Ms will show greater stability in their mean Ps choices from trial to trial in the PC_1 than in the AE_1 condition. The smoothed means per trial for this motive group and for the Maf in the two contexts are shown in Figure 1. While no prediction was made concerning the Maf, it is of interest to compare all four subgroups first with one another and then in relation to the means per trial for all 120 subjects (these are shown as triangles in Figure 1). The latter set of trial means follows a relatively regular horizontal curve with each mean departing little from .4.

Insert Figure 1 about here

Inspection of Figure 1 suggests that the Ms in PC_1 are the most stable in their trial to trial Ps choices and most closely approximate the total sample curve. The curve for the Maf in AE_1 is also relatively regular but progresses from high Ps choices (easy goals) to lower Ps values. The other subgroups--the Ms in AE_1 and the Maf in PC_1--are more variable, and in the first seven trials their curves are almost mirror images of one another.

Table 3 shows the means per trial of deviations of Ps choices from .4 of each of the four subgroups and a three-way analysis of variance of these means taking account of the repeated measures in the trials.

Insert Table 3 about here

The significant ($p < .05$) three-way interaction in Table 3 indicates genuine differences in the trial to trial behaviour of the four subgroups. The extent to which the four curves depart from the sample curve which is itself relatively regular and horizontal is tested in the following fashion. The Kruskal-Wallis analysis of variance is applied to the ranks of the distances on each trial of each subgroup mean from the sample mean for that trial. For this the unsmoothed mean values are used. The resulting chi-square value is 20.98 (df 3, $p < .001$). When the Mann-Whitney U test is applied to pairs of subgroups, the two Ms subgroups differ reliably ($U = 99$, $t = 3.70$, df 18, $p < .005$), thus supporting the prediction in H_3. The two motive subgroups operating in PC_1 differ significantly ($U = 81$, $t = 2.34$, df 18, $p < .05$) but those operating in AE_1 give $U = 65$ ($t = 1.13$, NS). This latter pair of findings is further evidence that differences in the goal-setting behaviour of Ms and Maf subjects occur reliably only in PC contexts. The Maf subgroups differ at a level approaching significance ($U = 77$, $t = 2.04$, df 18, $p < .06$). The two contexts produce greater differences among the Ms than among the Maf.

The prediction in H_4 is that the Ms will score more points than the Maf in PC contexts. Mean scores and t tests of the differences between the means of these two motive groups in PC_1, $PC_{2,3}$ and in the two conditions combined are shown in the upper section of Table 4.

Insert Table 4 about here

For the combined PC conditions and for PC_1, the predictions of higher scores for the Ms are supported. Data supporting the null prediction in H_5--that the motive groups will not differ in performance in AE--are shown in the lower section of Table 4.

As the same subjects performed in the AE_1 and AE_2 conditions, it is of interest to determine whether the apparently larger gain made by the Maf from the first to the second set of 10 trials is significant. The Mann-Whitney U value is 96.5 (t = 1.41, NS). In performance in AE_1--the condition most comparable with the single set of 10 trials in each PC condition--the two motive groups do not differ reliably, thus supporting H_5.

The significant difference in AE_2 ($p < .05$) suggests that the Maf, once they have settled down in the AE context, are able to perform better than the Ms. Their superior performance, however, is not due to their setting themselves more success-oriented goals, i.e., with median Ps values. In AE_2, their mean Ps choice of .35 (see Table 2) is the lowest value for any motive group in any condition, while that of the Ms is .40. While most subjects in the experiment proper obtained higher scores than their pre-experimentally established objective probabilities suggested that they should, the Maf in AE_2 exceed the scores they were expected to make more than any other subgroup does (see Table 5). Another interpretation of these findings is offered later.

Insert Table 5 about here

The discrepancy between each subject's score on 10 trials and his expected score is calculated as in the following example:

	Trial										
	1	2	3	4	5	6	7	8	9	10	
Ps chosen	.1	.2	.2	.2	.4	.4	.4	.2	.3	.2	
Points offered	9	8	8	8	6	6	6	8	7	8	
Ps x points	0.9	1.6	1.6	1.6	2.4	2.4	2.4	1.6	2.1	1.6	$\Sigma = 18.2$

The underlined values represent the four successful trials which yielded 26 points. Theoretically, this subject should have obtained only 18 points--the integer nearest to the summed value (18.2) of each Ps choice multiplied by its equivalent points value. Table 5 shows the mean discrepancies between Ms and Maf subgroups under the various AE and PC conditions.

It is only in the AE_2 condition that the two motive groups differ significantly in the extent to which their actual scores exceed their expected scores. The Maf are superior to the Ms in AE_2, whereas in the PC conditions the nonsignificant trend ($t = 1.40$) is in the opposite direction. Not only do the two contexts differentially affect the goal-setting of the motive groups but they also affect the quality of the subject's performance regardless of his particular Ps choices.

In H_6 it is predicted that high defensive subjects will show greater differences in goal-setting between the AE and PC contexts than will less defensive subjects. Data relevant to H_6 are shown in Table 6 for all 120 subjects.

Insert Table 6 about here

The significant interaction in Table 6 is largely due to the difference in the Ps choices of the high defensive subjects in the two contexts. Table 7 shows that among subjects classified as Ms and Maf the significant trend in Table 6 is even stronger among the Ms but is nonsignificant (all $\underline{F}$ values less than unity) among the Maf.

Insert Table 7 about here

These data suggest that defensiveness may act in a fashion similar to that hypothesized by Atkinson and O'Connor (1966) for $\underline{n}$ Affiliation in relation to summated motivation. In H_7 it is predicted that the summated arousal measure ($\underline{n}$ Ach + $\underline{n}$ Aff + Def - Test Anxiety) will correlate negatively with deviations of Ps choice from .4 and positively with performance scores in PC conditions, whereas the reverse will hold in the AE context.

Table 8 shows data relevant to H_7 for those 72 subjects who are classified as Ms or Maf. The analysis is shown for defensiveness as the only extrinsic motive. Analyses employing $\underline{n}$ Affiliation alone and in combination with defensiveness failed to produce statistical significance. Also shown in parentheses are the correlations for ($\underline{n}$ Ach - Test Anxiety) which serve as a basis for judging whether the inclusion of defensiveness affects the behaviour of the two groups defined in terms of their scores on measures of achievement motivation.

Insert Table 8 about here

The data in Table 8 mostly support H_7. The significant negative correlation ($r = -.39$, $p < .01$) between summated arousal and deviations of Ps choices from .4 in the combined PC groups and the significant difference ($\underline{t} = 1.78$,

$p < .05$, one-tail) between this and the correlation in AE ($r = .08$) are as predicted. The equivalent correlations between the achievement arousal measure (n Ach - Test Anxiety) and deviations of Ps choices from .4 do not differ significantly in the AE and in the combined PC conditions ($t = 1.55$). It should be noted, however, that the coefficients for the (n Ach - Test Anxiety) measure are similar to those for the (n Ach + Def - Test Anxiety) measure.

The correlation between summated arousal and performance in the combined PC groups is significant ($r = .43$, $p < .01$). However, the difference between this coefficient and that for the AE context ($r = .05$) is not significant ($t = 1.55$). The equivalent correlations between (n Ach - Test Anxiety) and performance differ even less ($t = 1.35$).

Discussion

The present study supports Atkinson's model and earlier findings in relation to the Ps choices of the Ms and Maf when the goal-setting task is presented in a peer-competitive context. The model, as originally devised (Atkinson, 1957), does not hold when the task context is adult evaluative.

There is some support in the present results for the more recent suggestion (Atkinson, 1967) that summated motivation, including motives extrinsic to the task, may be related to effectiveness of goal-setting strategies and to efficiency of performance in a curvilinear fashion as shown in Figure 2.

Insert Figure 2 about here

The graph represents three levels of summated arousal (1 = low, 2 = moderate, 3 = high) for each of three individuals who differ in their chronic strengths of motive to achieve (a is low and c is high). Atkinson says:

"When the final strength of the tendency to undertake the task is in the range of weak to moderate--e.g. if a person were left alone in a room to work on a task . . . the relationship between n Achievement and performance would be positive . . . . But now suppose that other factors in the personality of the individual and in the situation he confronts serve to heighten the final strength of tendency systematically so that it falls in the middle range on our graph . . . we would now expect the correlation . . . to be zero. And if the presence of other aroused motives, e.g. the need for social approval, produced a very intense level of final motivation for the task, we would paradoxically expect that the person who scores highest in n Achievement would perform least well: the relationship between strength of achievement motive and performance would be negative. Paralleling these three hypotheses, but exactly opposite in direction, are the expectations we should have concerning the effects of individual differences in Anxiety on performance [Atkinson, 1967, pp. 6-7]."

The correlations in Table 8 between summated arousal and performance are either positive or zero-order. As those in the PC condition are positive, it seems that such a context elicits little motivation other than that intrinsic to the task itself. As the correlations in the AE context are zero-order it would seem that extrinsic motives are only moderately aroused. This may be so because 'evaluation' in the AE context is only implicit and not explicit. It may be necessary to use strong manifest evaluation in order to produce 'a very intense level of final motivation.'

At the conclusion of AE_1 and just prior to AE_2 the experimenter said to the subject, "I'll give you ten more shots . . . . Let's see if you can get even more points this next time . . . at least try to beat your first score."

As this statement is more explicitly 'evaluative' than any statements made prior to or during the AE_1 and the PC conditions, performance in AE_2 should show the decline predicted by Atkinson for supra-optimal arousal. Figure 3 shows the performance curves for three groups differing on the summated arousal measure (n Ach + Def - TA) in each of four conditions, AE_1, AE_2, PC_1 and $PC_{2,3}$. It should be remembered that because the same subjects operated in AE_1 and AE_2 there may have been some practice effect, whereas different subjects operated in the two PC conditions. Casual inspection of Figure 3, however, shows that from AE_1 to AE_2 the group low in summated motivation made large gains, whereas the group high on this variable obtained identical means in the two sets of trials. A two-way analysis of variance relevant to Figure 3 is shown in Table 9.

Insert Figure 3 and Table 9 about here

The effect of context and the interactive effect of summated motivation and context are both significant ($p < .05$). On the assumption that summated arousal is highest in the AE_2 condition and is higher in general in AE than in PC contexts, the data in Figure 3 lend themselves to an interpretation in terms of Atkinson's hypothesised inverted U curve. Let us consider the two averaged (dotted) curves, one for the AE and the other for the PC conditions. On the assumption that AE elicits more defensiveness than PC, the summated arousal in AE should be higher than it is in PC. If the AE averaged curve is placed just to the right of that for PC, we have an inverted U.

Because of the potentially contaminating effect of practice in AE_2, the present evidence for Atkinson's hypothetical inverted U curve is not as

convincing as it might have been. A study is being planned to investigate the effects of explicit as well as implicit evaluation in an AE context in comparison with the effects of operating in a PC context.

The present study also suggests that while the Ms are optimally motivated in PC contexts, their opposites, the Maf, benefit more from adult evaluation and that, as this becomes more explicit (as in AE_2), they tend not only to set themselves more difficult goals but also to achieve more of these goals than they do in AE_1 and clearly more than they do under PC conditions.

That the inclusion of n Affiliation in one of the summated arousal measures has not produced the expected effect in the present study may be due to its highly skewed distribution with few subjects achieving positive scores.

In relation to data in Tables 6 and 7 it might be suggested that the Ms who are high in defensiveness set themselves goals in AE with Ps values close to .5 so as to appear rational in their decision-making. If this is so, they may be operating in terms of image-maintenance as discussed by Kogan and Wallach (1967). However, as the mean Ps of .56 chosen by the three subjects in this subgroup is considerably higher than the means of most other subgroups, they may have felt a need to be certain of achieving some, if only limited, success in the presence of an adult.

Summary and Conclusions

1. Predictions from Atkinson's M-P-I model are verified in the peer-competitive (PC) but not in the adult-evaluative (AE) context in which the risk-taking task is presented.
2. 'Success-oriented' Ms subjects (high n Achievement:low test anxiety) are more consistent in their trial-to-trial goal-setting behaviour in the PC than in the AE context.

3. The performance of the Ms is better than that of the 'failure-avoidant' Maf (low n Achievement:high test anxiety) in the PC context, but the trends are reversed in the AE context.
4. There is a significant interaction between defensiveness and context on the goal-setting of the Ms. High defensive Ms set themselves easy goals in the AE context but difficult goals in the PC context.
5. The 'summated arousal' measure (n Achievement + Defensiveness - Test Anxiety) is related positively to performance in the PC context but zero-order in the AE context. On the assumption that the AE context elicits defensiveness more than the PC context does, the last-mentioned findings can be interpreted in terms of an inverted U curve between overall arousal and performance.

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Footnotes

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[2]The PC_2 and PC_3 positions are arbitrarily treated as providing 'similar' information which the subject may use in making his choice of goals.

Table 1

Allocation of Subjects to Experimental Conditions

	Condition				
Motive Groups (n Achievement: Test Anxiety)	AE	PC_1 for Ms & Maf	PC_2 for Ms & Maf	PC_3 for Ms & Maf	Total
High:Low (Ms)	12	12	6	6	36
Low:High (Maf)	12	12	6	6	36
		PC_2 or PC_3	PC_1 or PC_3	PC_1 or PC_2	
High:High	-	24	12	12	48
Low:Low	-	24	12	12	48
Total	24	72	36	36	168

Table 2

Mean Absolute Deviations of Ps Choices from .4 Made by the Ms and Maf in the PC and the AE Contexts

	Mean Deviation from .4 in PC Contexts					
	PC_1		$PC_{2,3}$		$PC_1 + PC_{2,3}$	
	Ms	Maf	Ms	Maf	Ms	Maf
	.12 (.39)[a]	.17 (.42)	.11 (.40)	.15 (.35)	.12 (.40)	.16 (.39)
$\frac{t}{diff.}$	2.24 (sf 29, $p < .05$)		2.15 (sf 29, $p < .05$)		3.11 (sf 46, $p < .01$)	

	Mean Deviation from .4 in AE Contexts			
	AE_1		AE_2	
	Ms	Maf	Ms	Maf
	.14 (.46)[a]	.14 (.37)	.13 (.40)	.14 (.35)
$\frac{t}{diff.}$	< 1.00 (NS)		< 1.00 (NS)	

[a]The values shown in parentheses are the mean Ps choices of these subgroups.

Table 3

Three-Way Analysis of Variance of Mean Absolute Deviations from .4 of Ps Choices per Trial for Subjects Classified in Terms of Achievement Motivation and the Social Context in Which They Operated

		Mean Deviation from .4										
		Trial										
		1	2	3	4	5	6	7	8	9	10	Total
Ms	PC_1	.12	.09	.12	.10	.10	.12	.12	.13	.13	.18	.12
	AE_1	.11	.11	.17	.14	.11	.12	.18	.12	.20	.18	.14
Maf	PC_1	.15	.15	.18	.22	.17	.17	.21	.16	.12	.17	.17
	AE_1	.18	.17	.10	.08	.15	.10	.12	.15	.18	.18	.14
Total		.14	.13	.14	.14	.13	.13	.16	.14	.16	.18	.14

Analysis of Variance of Means

Source	SS	df	MS	F	p
Between Ss	190.18	47			
(A) Motivation	6.30	1	6.30	1.57	NS
(B) Context	0.17	1	0.17	< 1.00	--
AB	7.25	1	7.25	1.81	NS
Ss within groups	176.46	44	4.01		
Within Ss	422.30	432			
(C) Trials	11.08	9	1.23	1.29	NS
AC	6.64	9	0.74	< 1.00	--
BC	10.52	9	1.17	1.23	NS
ABC	16.44	9	1.83	1.95	<.05
C x Ss within groups	377.62	396	0.95		

Table 4

Mean Scores of the Ms and Maf in the PC and in the AE

	Conditions					
	PC_1		$PC_{2,3}$		$PC_1 + PC_{2,3}$	
	Ms	Maf	Ms	Maf	Ms	Maf
	31.08	22.50	33.67	27.33	32.38	24.92
$\frac{t}{diff.}$	1.95 (df 22, $p < .10$)		1.56 (NS)		2.49 (df 46, $p < .05$)	
	AE_1		AE_2		Difference ($AE_2 - AE_1$)	
	Ms	Maf	Ms	Maf	Ms	Maf
	29.25	27.92	29.83	39.17	0.58	11.25
$\frac{t}{diff.}$	0.32 (NS)		2.11 (df 22, $p < .05$)		1.41 (NS)	

Table 5

Mean Discrepancies between Obtained and

Expected Performance Scores

	Context				
	AE_1	AE_2	PC_1	$PC_{2,3}$	$PC_1 + PC_{2,3}$
Ms	7.53	8.43	9.43	11.45	10.44
Maf	8.08	19.68	2.28	7.73	5.01
t diff.	0.17	2.19	1.10	0.81	1.40
(*df* & p)	(22,NS)	(22,$p<.05$)	(22,NS)	(22,NS)	(46,NS)

Table 6

Mean Ps Choices of High and Low Defensive Subjects in AE and PC Contexts

Defensiveness	Context	
	AE	PC
High	n = 10 .44	n = 38 .36
Low	n = 14 .40	n = 58 .42

Analysis of Variance of Means

Source	SS[a]	df	MS	F	p
(A) Defens.	337.93	1	337.93	3.41	<.10
(B) Context	61.23	1	61.23	< 1.00	--
AB	415.18	1	415.18	4.20	<.05
Error	11480.27	116	98.97		
Total	12292.32	119			

[a]Decimal points are ignored, i.e., each Ps value is treated as a whole number.

Table 7

Mean Ps Choices of the Ms and the Maf Classified on Defensiveness Scores and Operating in Either the PC or AE Contexts

		Context					
		AE		PC		Total	
	Defens.	n	Mean	n	Mean	n	Mean
Ms	High	3	.56	8	.33	11	.39
	Low	9	.43	16	.43	25	.43
Maf	High	7	.39	9	.36	16	.37
	Low	5	.34	15	.39	20	.38

Analysis of Variance of Ms Means

Source	SS	df	MS	F	p
(A) Defens.	10.78	1	10.78	< 1.00	--
(B) Context	800.30	1	800.30	8.09	<.01
AB	883.54	1	883.54	8.93	<.01
Error	3166.51	32	98.95		
Total	4861.13	35			

Table 8

Correlations of the Summated Motivation Measure (n Ach + Def - TA) with Deviations of Ps Choices from .4 and with Performance Scores in AE and PC Contexts (Shown in Parentheses Are Correlations of (n Ach - TA) with the Same Variables

	Correlations of (n Ach + Def - TA) with		
	n	Dev. from .4	Performance
AE_1	24	0.08 (-0.05)	0.05 (0.08)
PC_1	24	-0.38 (-0.43*)	0.46* (0.42*)
$PC_{2,3}$	24	-0.40 (-0.42*)	0.39 (0.40)
$PC_1 + PC_{2,3}$	48	-0.39** (-0.43**)	0.43** (0.41**)
t diff. $AE_1 - PC_1$		1.55(NS)(1.33,NS)	1.45(NS)(1.19,NS)
$AE_1 - (PC_1 + PC_{2,3})$		1.86($p<.05^a$)(1.55,NS)	1.55(NS)(1.35,NS)

*p < .05

**p < .01

[a]One-tail test

Table 9

Two-Way Analysis of Variance of Mean Performance Scores Depicted in Figure 3

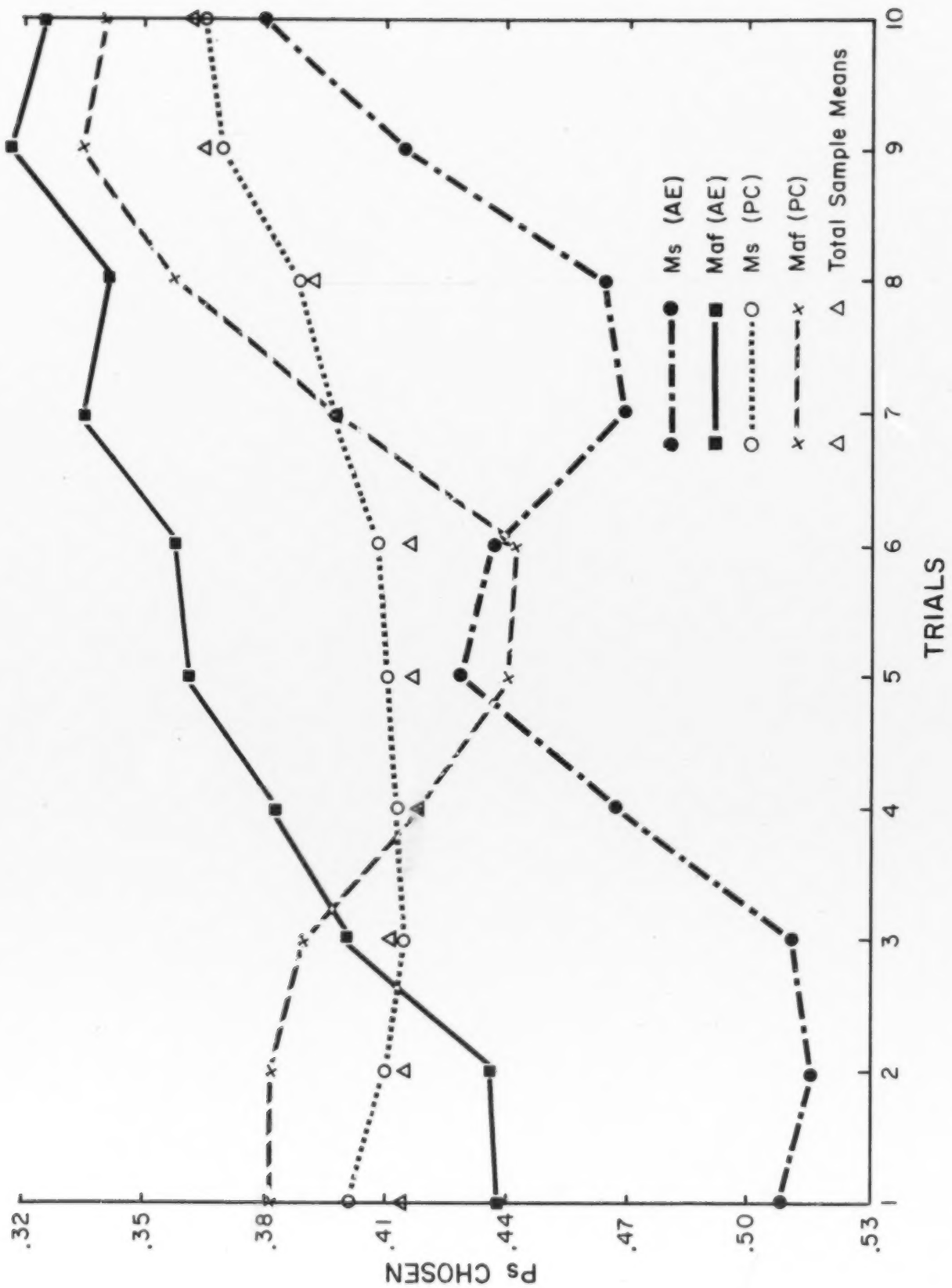
Source	SS	df	MS	F	p
Summ. Arousal	238.93	2	119.46	1.10	NS
Contexts	1079.76	3	359.92	3.35	<.05
Arousal x Context	1620.36	6	270.06	2.52	<.05
Error	14162.94	132	107.29		
Total	17101.99	143			

Figure Captions

Fig. 1. Smoothed curves of mean Ps choices per trial in the Adult-evaluative (AE) and Peer-competitive (PC) contexts made by the Ms and Maf.

Fig. 2. The hypothetical relationship between the strength of tendency (summated motivation) to perform the task and actual performance for three individuals (a, b, and c) at three levels of arousal (1, 2, and 3).

Fig. 3. Mean performance scores of groups of Ss operating in four contexts (AE_1, AE_2, PC_1, $PC_{2,3}$) and classified in terms of summated motivation scores.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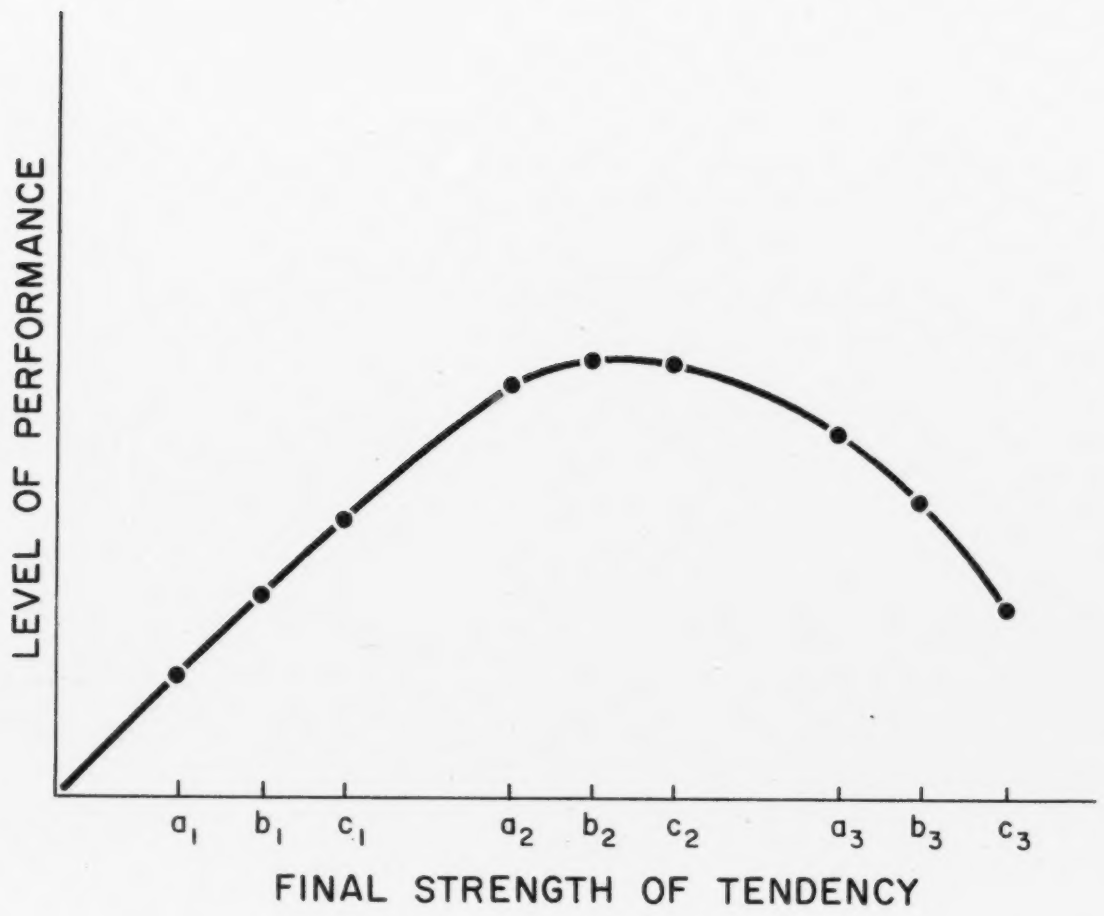
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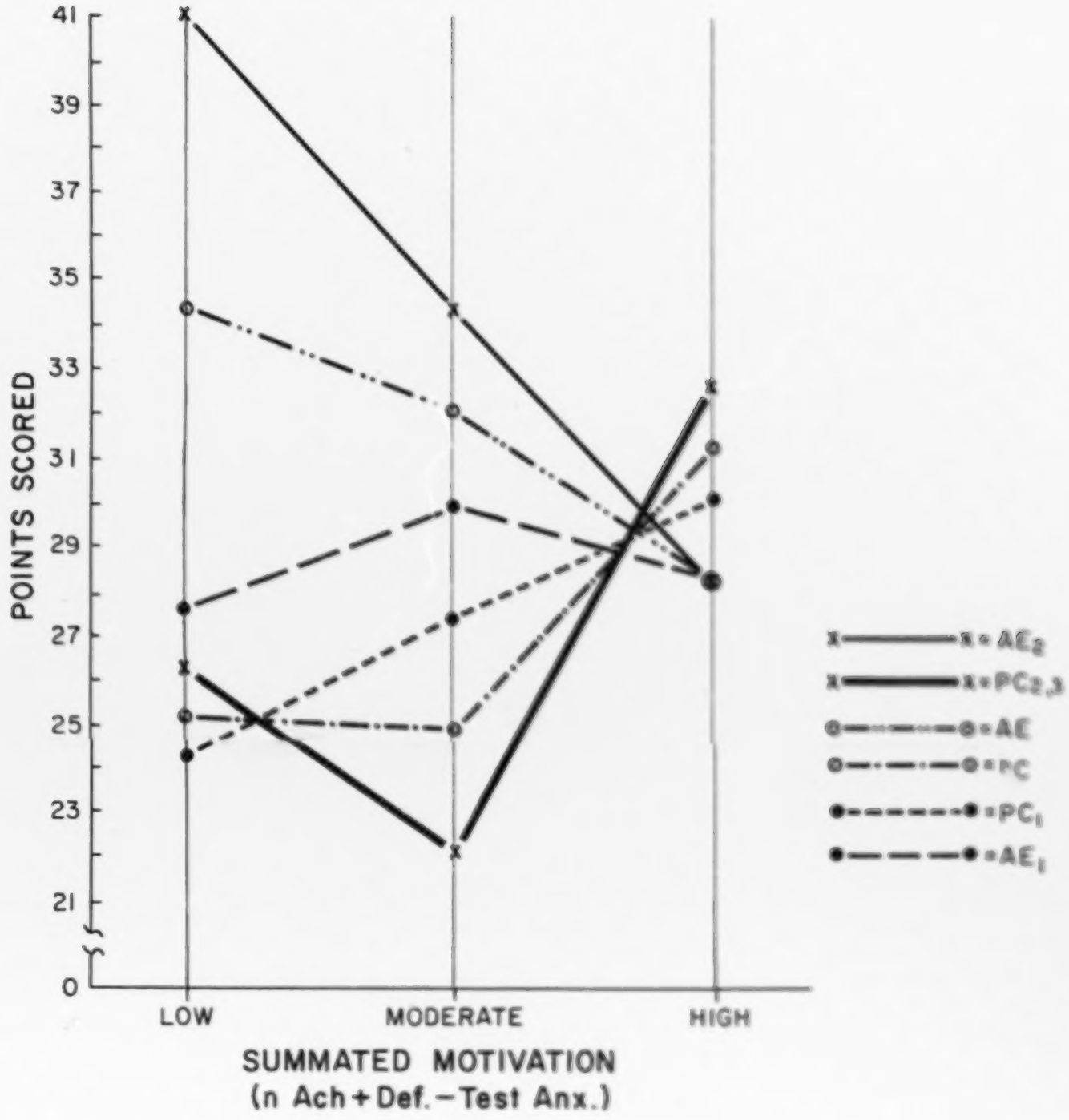
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POINTS SCORED
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(n Ach + Def. − Test Anx.)
= AE2
= PC2,3
= AE
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= AE1